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CENTRAL PACIFIC RAILROAD

OF

CALIFORNIA.

REPORT

OF

GEORGE E. GRAY,

LATE CHIEF ENGINEER OF THE N. Y. CENTRAL R. R.,

UPON

THE CONSTRUCTED ROAD

AND

THE LOCATED ROUTE,

MADE

JULY 31, 1865.

H. S. CROCKER & CO., PRINTERS, 92 J STREET.

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OFFICE OF THE CENTRAL PACIFIC R. R. Co. }
OF CALIFORNIA, }
SACRAMENTO, July 10, 1865. }

MR. GEO. E. GRAY—

Late Chief Engineer of the N. Y. Central R. R.:

DEAR SIR: This Company is now actively engaged in the construction of a Railroad over the Sierra Nevadas, one of the highest mountain ranges, traversed by any railroad, on this Continent. The work is one of great magnitude, and National importance, and we desire to obtain the benefit of your views, in relation to the best mode of prosecuting the work, as your long experience as a Railroad Engineer, acquired as Chief Engineer of the New York Central, as well as other roads, will render your opinion of great value to us. We wish, therefore, you would make a thorough and careful examination and inspection of the work already completed, and the line as located and in process of location by our Engineers, and favor us with your views thereon.

Yours, most respectfully,

LELAND STANFORD,

Pres't C. P. R. R. Co.



SAN FRANCISCO, July 31st, 1865

HON. LELAND STANFORD—

President of the Central Pacific R. R. Co. of California :

SIR : In compliance with your request, I have made an examination and inspection of the Central Pacific Railroad of California, commencing at the city of Sacramento, thence to Clipper Gap, which includes that portion of the Road now in successful operation, and from Clipper Gap to Illinoistown, which includes the portion in course of construction. I have also carefully examined the line as located from Illinoistown [since called Colfax] to the mining town of Dutch Flat.

From Dutch Flat, the end of the finally located portion of the line, I have traversed and fully examined the route as recently surveyed by your Company via. the Donner Pass, over the Sierra Nevada Mountains to the Truckee River, on the Eastern slope of the Sierras, thence through the cañon to Crystal Peak, a distance of about thirty-six miles from the summit at the Donner Pass.

That portion of the Railroad constructed and in operation from the city of Sacramento to Clipper Gap, a distance of 43 miles, and which attains an elevation of 1,785 feet above the sea, will compare most favorably in every respect with any railroad in the United States. The road bed and mechanical structures are well constructed, ample provision being made for drainage, the cross ties are of redwood, and the whole laid with a rail of 60 lb weight per yard, and set in wrought iron chairs. The locomotives, cars and machinery are all of the first quality and of the best material, and are maintained in good order.

The grading, etc., from Clipper Gap to Illinoistown is pro-

gressing rapidly, a force of 3,000 to 4,000* men, with a suitable proportion of carts and teams, being employed thereon. I should think this section could be ready for traffic by the first of October next.†

From Illinoistown the line is finally located, fully prepared for the work of grading, to the town of Dutch Flat, a distance of 14 miles, and 68 miles from the city of Sacramento. After carefully reviewing this portion of the route, I am sure the line of location has been well selected, keeping in view the elevation to be ultimately attained at the summit of the mountains, and the distance within which it is to be overcome.

The line from Sacramento to Dutch Flat, in general, is located and constructed on the route surveyed by the late T. D. Judah, Esq. From the latter place to the summit of the Donner Pass, another survey and examination has recently been made by your Acting Chief Engineer, S. S. Montague, Esq., on a different route from that taken by Mr. Judah. Mr. Judah's line ran from Dutch Flat, up the Bear River valley, thence to the South Yuba, and thence up the valley of the Yuba to the summit of the Donner Pass, encountering some very heavy work, including ten tunnels, of an aggregate length of 7,740 feet, averaging 774 feet each, with heavy grades, and failing to attain sufficient elevation to make the work easy.

Mr. Montague leaves Mr. Judah's line a short distance above Dutch Flat, thence diverging to the right and crossing the dividing ridge to the North Fork of the American River, thence along the slopes of the hills to Cañon Creek, thence up Cañon Creek to the divide between that creek and Bear Valley, at what is called Emigrant Gap, thence along the slopes of the hill sides of Bear Valley and the Yuba Bottoms to Crystal Lake, thence up the South Yuba to the summit of Donner Pass.

I did not pass over all of Mr. Judah's line through Bear Valley, but from a comparison of his maps and profiles, and a personal examination of the line surveyed by Mr. Montague, I have no hesitation in pronouncing the latter decidedly preferable in all respects; it being more economical of construction, including only six tunnels, of the aggregate of but 2,350 feet, and averag-

* Since increased to about 5,000. † It was completed September 1st.

ing less than 400 feet each. Besides, no loss of elevation is suffered, the grades are no heavier, and the line is shorter by about 5,000 feet between Dutch Flat and Crystal Lake, a distance of about $22\frac{1}{2}$ miles.

From Crystal Lake to Summit Valley, and thence to the Summit at Donner Pass, the grades by the new line will be much less than the maximum, far less than on Mr. Judah's, and without any loss of distance, or requiring a tunnel of more than 1,350 feet at the Summit.

From Donner Pass, or the Summit, I followed Mr. Judah's line (the only one as yet run), to the junction of Donner Creek, the outlet of Donner Lake, with the Truckee River, a distance of $11\frac{1}{2}$ miles. This line, from the Summit to the Truckee River, after passing a distance of about two miles of heavy work, around the face of the Donner Peak, is quite easy of construction, the descent being made all the way with a regular grade of 105 feet per mile, and without encountering any very formidable obstacles.

The recent surveys down the Truckee River, from the mouth of Donner Creek, through the cañon where the river pierces the Eastern range of the Sierra Nevadas, have developed an excellent line, with light grades, all descending eastwardly, and comparatively easy of construction.

The ease with which this Eastern range is passed by your route is one of its most important features. In addition to its other advantages, it enables you to pass rapidly out of the snow belt, and with a shorter snow line than could otherwise be attained. That portion of the line along the Truckee River will be comparatively free from snow, and by properly constructing your road over the mountains the snow will not form any insuperable difficulty in operating it.

The suggestion made in your recent annual report respecting the construction of that portion of your road lying along the Truckee River, from Donner Lake to the Big Bend, in advance of a completed line over the Summit, I deem an important one. It can be built within twelve months, and be profitably operated in connection with the Virginia and Truckee River Railroad in Nevada, while the more difficult portion of your mountain line

is progressing. The increased cost of constructing this portion, in advance of a completed line over the mountains, will be more than compensated by the advantages which it will secure. A temporary track along the present wagon road, from the head of Donner Lake to the Truckee River, in connection with the permanent road down the Truckee River, can be laid without costing much if any more than the track laying, as the present grade of the wagon road is uniformly level, and the alignment good. This would reduce the wagon and stage transportation six miles.

The survey made by Mr. Judah demonstrated the fact that a feasible route for a railroad could be obtained through the Donner Pass, and the recent more thorough examinations have shown that his line can be improved upon in many particulars, in alignment, in elevations, and in cost of construction.

In view of the developments made by recent surveys, it seems important that they should be continued as rapidly as possible, and I am sure that many of the apparently difficult and expensive points can be avoided or materially reduced, if sufficient time is given to secure better lines.

From the examinations I have made, having traveled the entire distance on horseback or on foot, I feel confident that your Railroad can be constructed over the Sierra Nevadas, with the laboring force you will probably be able to command in California, within two years from next Spring, and at a cost not exceeding the mountain work on the Baltimore & Ohio, Pennsylvania Central, New York & Erie, and Hudson River Railroads. In fact, it is quite a remarkable feature of your route, that so elevated a mountain range can be surmounted with such comparatively light grades and curves, and at a cost which will favorably compare with other important railroads, long in successful operation.

I am, very respectfully yours, etc.,

GEO. E. GRAY,
Civil Engineer.



